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(71) 出願人 595086030

箕浦 佳美

名古屋市守山区野萩町11-7

(71) 出願人 595044971

松岡 孝

千葉県印旛郡栄町安食3789

(72) 発明者 松岡 孝

千葉県印旛郡栄町安食-3789

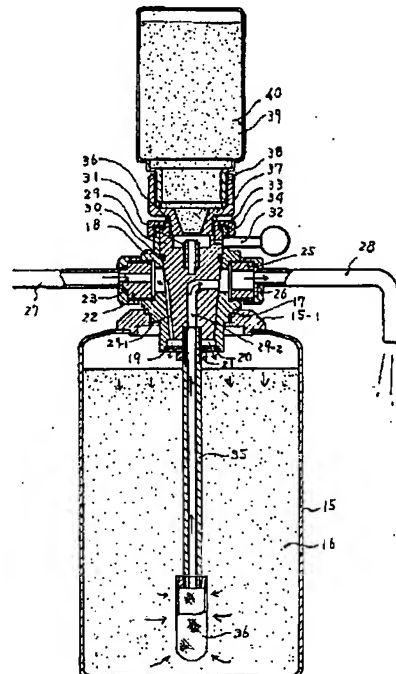
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(54) 【発明の名称】 食塩再生器付き小型イオン交換樹脂軟水器

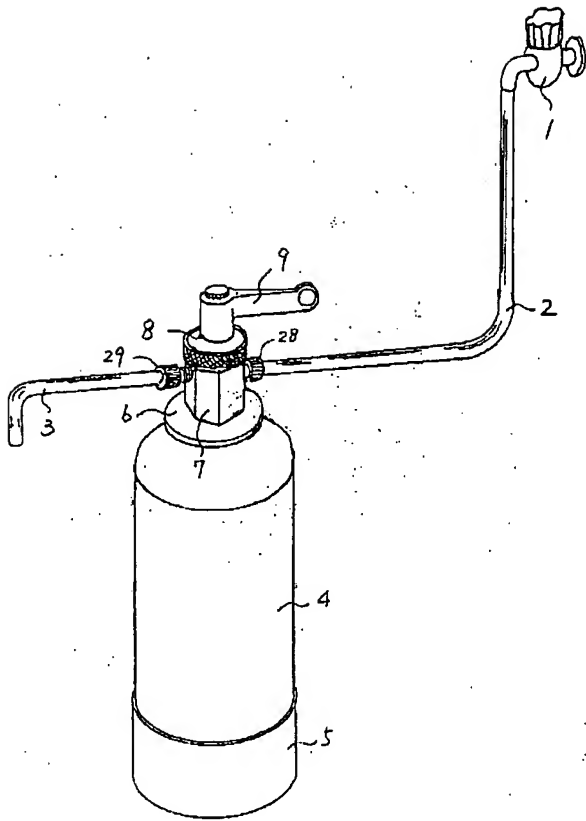
(57) 【要約】

【目的】本発明は、食塩再生器付き小型イオン交換樹脂軟水器に関する。イオン交換樹脂軟水器において、硬水を軟水化する場合、硬水を前記イオン交換樹脂軟水器に通し、硬水成分である $Ca^{++}$ 、 $Mg^{++}$ をイオン交換樹脂で吸着して軟水化している。吸着する能力のなくなった、即ち、劣化したイオン交換樹脂には、食塩水を通し、 $Ca^{++}$ 、 $Mg^{++}$ を、 $Na$ イオンで置換して吸着能力を再生、活性化する必要がある。本発明は、食塩再生器付きの小型イオン交換樹脂軟水器であって、軟水採取、逆流洗浄(逆洗)、再生の三方向切り換えバルブを有し、上部にカートリッジ式の食塩再生ボトルを着脱せしめることにより、劣化したイオン交換樹脂を、簡便に効率よく、再生できる小型イオン交換樹脂軟水器を提供することを目的とする

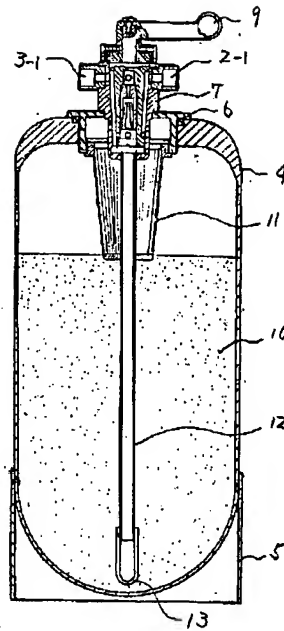
【構成】イオン交換樹脂容器と、軟水採取流路、逆洗流路、カートリッジ式食塩再生ボトルを経由して前記軟水採取流路の三方向切り換えバルブと、カートリッジ式食塩再生ボトルよりなる小型イオン交換樹脂軟水器



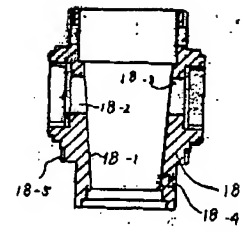
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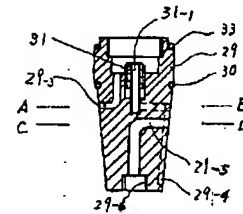
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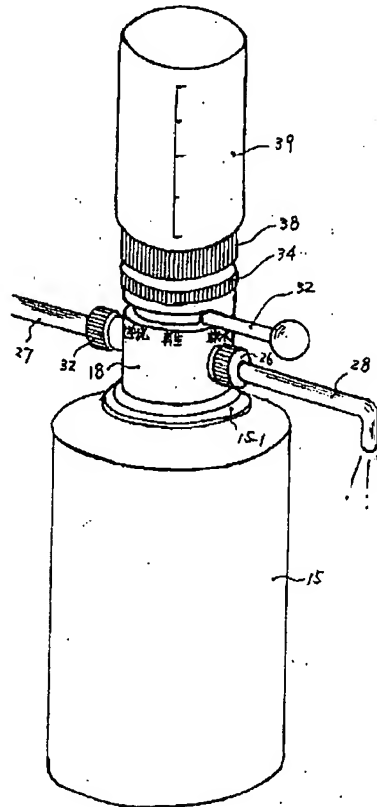
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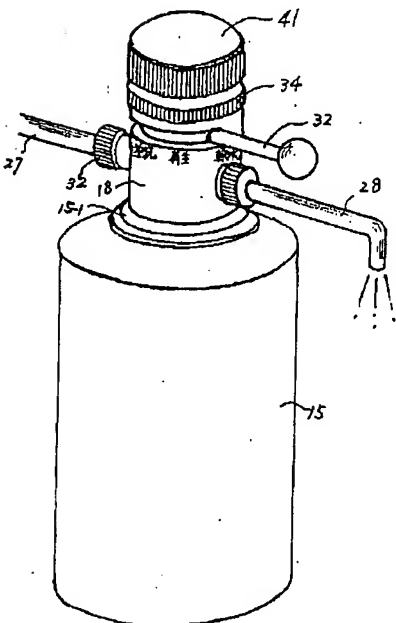
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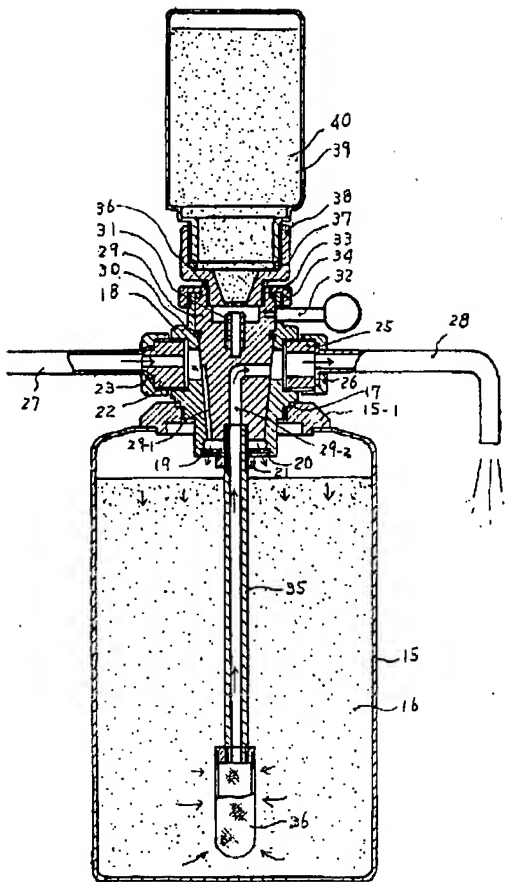
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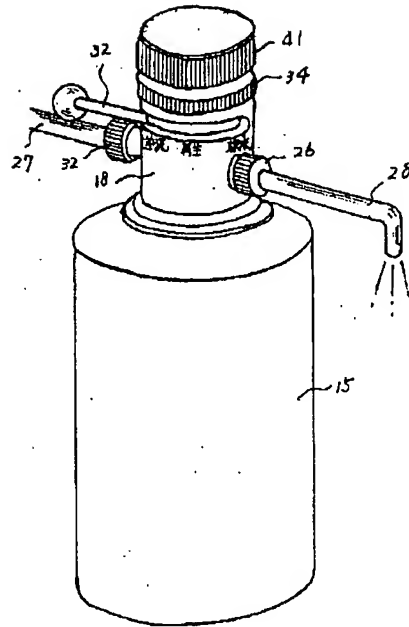
【図5】



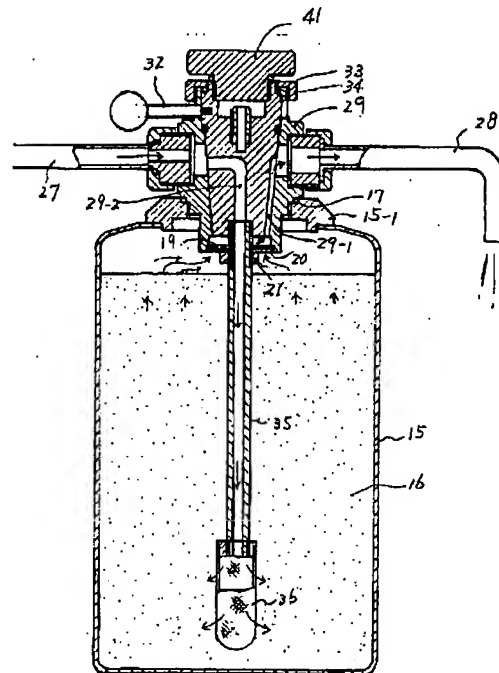
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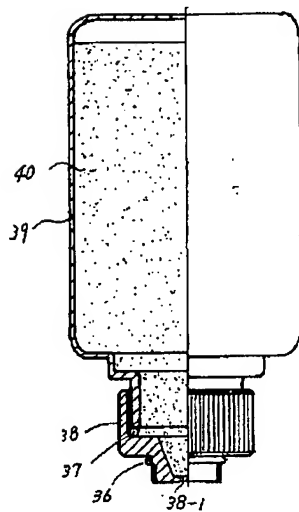
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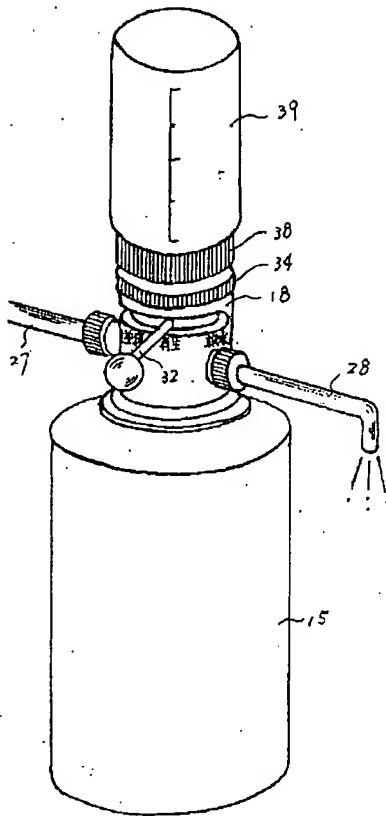
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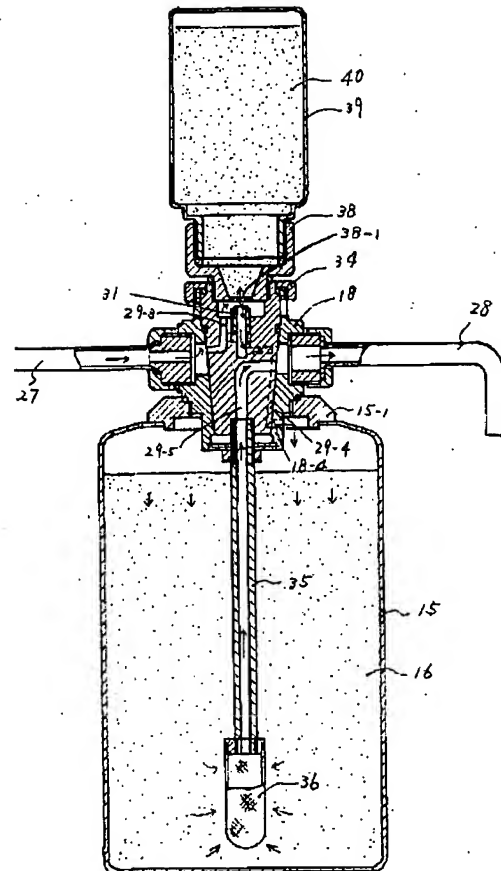
【図10】



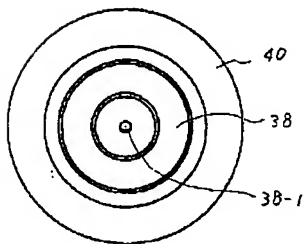
【図8】



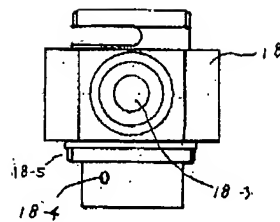
【図9】



【图 1 1】



【图 14】



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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention is a small-with salt regenerator ion-exchange resin water softener used connecting with a waterworks faucet, is only a switch of a three way switch bulb, and relates brine to the soft water extraction, the reverse current cleaning (back wash) of ion-exchange resin, and the ion-exchange resin that deteriorated at through and the simple small-with salt regenerator ion-exchange resin water softener which can be reactivated.

[0002]

[Description of the Prior Art] In the water softener by conventional small ion exchange resin, the ion exchange resin included in a cloth bag was picked out from the water softener, it exchanged for the reproduced ion exchange resin containing a cloth bag beforehand, or the upside cap was removed, the salt of a constant rate was put into the water-softener container, and, as for the ion exchange resin which deteriorated, that you make it reactivation, i.e., reproduce, was carrying out tap water with the sink.

[0003]

[Problem(s) to be Solved by the Invention] In a small water softener, there is also little capacity of ion exchange resin and the frequency which degradation already \*\* so much and is reproduced also increases. Then, efficiency, simple nature, and safety are required also for playback actuation. Recently, since this playback actuation of a small water softener was also inconvenient, a diffusion rate did not increase enough, and it was not utilized enough and it was also cutting the diffused thing. This invention of a domestic housewife is also efficient easily, and it is going to provide insurance with the small water softener which can carry out playback actuation.

[0004]

[Means for Solving the Problem] the upper part of an ion-exchange resin container -- a three way bulb with a horizontal handle -- preparing -- further -- the upper part -- attachment and detachment -- an easy cartridge-type salt recycled bottle is prepared. the mouthpiece furnished with this cartridge-type salt recycled bottle -- in order to reproduce efficiently, the ejector mechanism which adjusts salt concentration is formed in the section. Moreover, it enables it to have performed simply the reverse-current-cleaning function (back wash) flushed as pretreatment for performing this playback efficiently so that it may understand more nearly up than the lower part of ion exchange resin only by the switch of said three way bulb. Furthermore, the soft water extraction passage, back wash passage, and playback passage separate the structure of said three way bulb completely up and down, and it is constituted so that it may not mix.

[0005]

[Function] The small-with salt regenerator ion-exchange-resin water softener of this invention is used linking with the waterworks faucet 1 directly. First, if said horizontal handle is set as the location of the soft water extraction, when tap water will flow in the direction of a lower layer from the upper layer of ion exchange resin by said three way switch bulb, the hard water component of calcium++ and Mg++ adsorbs and soft water is extracted. Next, if said horizontal handle is rotated 180 degrees and said three

way switch bulb is switched to the location of a back wash, tap water flows from the lower layer of ion exchange resin in a direction to the upper layer, and can be efficiently reproduced by washing away so that said ion exchange resin may be understood. Furthermore, if said horizontal handle be return 90 degrees, it be set as a reproductive location and said three way switch bulb be switch, when flow on ion exchange resin, become the passage which change to another passage and be mix with said soft water passage and back wash passage at all, and melt the salt of a salt recycled bottle, the hard water component of calcium<sup>++</sup> and Mg<sup>++</sup> of which ion exchange resin be adsorbed be permute and reproduce with Na ion of brine. risk of brine mixing said playback passage, and the soft water passage and back wash passage up and down, as structure of a three way switch bulb, at the time of the soft water extraction and a back wash, since it dissociates completely -- there is nothing -- moreover -- opposite -- the time of the soft water extraction -- the time of a back wash -- salt container installation -- a mouthpiece -- there is no risk of a leak from the section. Salt is beforehand put in and prepared for the salt recycled bottle at a rate of about 120g per 1l. of ion exchange resin.

[0006]

[Example] the drawing after explaining the conventional water softener for concrete 1 example of this invention -- explaining ( drawing 1 ) -- the appearance sketch of the conventional water softener is shown. 1 is a waterworks faucet, it is led to the water-softener container 4 with a conduit 2, calcium<sup>++</sup> and Mg<sup>++</sup> which are the hard water component adsorb with internal ion exchange resin 10, and soft water is extracted from a discharge pipe 3 as soft water. As for a cap and 7, 6 is [ a diverter valve and 9 ] handles. ( Drawing 2 ) is the sectional view of the common water-softener container 4 of ( drawing 1 ). Here, the conventional water softener is explained briefly. 4 is a water-softener container and is put into ion exchange resin 10 inside. 5 is a foot and 6 is a cap. 7 is a diverter valve and 9 is a switch handle. if the waterworks faucet 1 is opened -- tap water -- a conduit -- it enters [ opening / 2-1 ] from a diverter valve 7, and flows more nearly caudad than the upper layer of ion exchange resin 10 from a filter 11. At this time, it is softened, and it passes along a conduit 12 from the bottom filter 13, and soft water is extracted [ diverter valve / 7 ] from a discharge opening 3-1. if a handle 9 is rotated 90 degrees, it is made the location of a back wash and the waterworks faucet 1 is opened -- tap water -- a conduit -- opening 2-1 -- a diverter valve 7 -- a passage -- a conduit 12 and the bottom filter 13 -- above -- going -- flowing . It goes into a diverter valve 7 from a filter 11, and is discharged from a discharge opening 3-1. At this time, ion exchange resin 10 is washed so that it may unfold toward the upper part according to a stream (it is called a back wash). This back wash is performed as pretreatment reproduced with brine. Next, the operating condition of the small-with salt regenerator water softener which is this invention is shown in ( drawing 3 ) as a sketch. The three way switch bulb section is prepared in the upper part of the water-softener container 15, and the cartridge-type salt recycled bottle section 39 is further attached in it. (Handstand mold) a conduit 27 is connected with the waterworks faucet section, and the tap water led to the water-softener container 15 is softened with the ion exchange resin in this water-softener container 15 -- having -- discharge -- soft water is extracted from a conduit 28. Each actuation of the soft water extraction, a back wash, and playback is switched by the horizontal handle 32.

[0007] ( Drawing 4 ) is the sectional view of ( drawing 3 ), and explains the structure in detail. 15 is a water-softener container and is put into ion exchange resin 16 inside. the upper part of said water-softener container 15 -- a container -- the mouthpiece 15-1 is welded. this container -- a mouthpiece 15-1 -- a valve body 18 -- O ring 17 -- minding -- screw \*\* rare \*\*\*\*\*. this valve body -- a conduit -- mouthpieces 22 and 25 -- screw \*\* rareness and a waterworks -- a conduit 27 and discharge -- the conduit 28 is bound tight with cap nuts 23 and 26. Inside said valve body 18, the conic three way switch bulb 29 is inserted free [ rotation ] through O ring 30, and is pressed down with the presser-foot nut 34 through O ring 33 in it. For ejector mechanism 31, in the upper part of this three way switch bulb 29, horizontal alder torr 32 is screw \*\* rare \*\*\*\*\* to screw \*\* rareness and an up side face. Moreover, the disk filter 19 is being fixed to said valve body 18 with which the catchment pipe 35 is fixed to the lower part, and the filter 36 is being fixed to screw \*\* rareness and the other end, and the pars basilaris ossis occipitalis of the three way switch bulb 29 with the nut 21 through the filter presser foot 20. In a head, the cartridge-type salt recycled bottle section does a handstand through O ring 36, and it is screw \*\* rare

\*\*\*\*\*. The structure of this cartridge-type salt recycled bottle section is put into salt 40 inside the salt container 39, O ring 37 is minded, and the salt container cap 38 is screw \*\* rare \*\*\*\*\*.

[0008] Next, an operation of this invention constituted in this way and a small-with salt regenerator ion-exchange-resin water softener is explained. the time of ( drawing 4 ) making the three way switch bulb 29 the location of the soft water extraction -- the horizontal handle 32 -- discharge -- it is set up in the direction of a conduit 28. a waterworks faucet (not shown) -- a waterworks -- the water led with the conduit 27 flows in the direction of an arrow head, and is softened with ion exchange resin 16 -- having -- as soft water -- discharge -- it is extracted from a conduit 28. namely, a waterworks -- a conduit 27 -- a valve body 18 -- entering -- the slot 29-1 of the three way switch bulb 29 -- the disk filter 19 and the filter presser foot 20 -- passing -- the upper layer of ion exchange resin 16 -- a lower layer -- going -- flowing -- a filter 36 -- the catchment pipe 35 -- the upper part -- flowing -- the passage 29-2 of the three way switch bulb 29 -- discharge -- soft water is extracted from a conduit 28. When passing ion exchange resin 16, it adsorbs and the hard water component of calcium++ of tap water and Mg++ is softened.

( Drawing 5 ) removes the cartridge-type salt recycled bottle section of ( drawing 4 ), and shows the sketch when binding a blank cap 41 tight. At the time of the soft water extraction, since the cartridge-type salt recycled bottle section is unnecessary, it can remove. ( Drawing 6 ) rotates the horizontal handle 32 180 degrees from ( drawing 5 ), and shows the sketch when setting the three way switch bulb 29 as the location of a back wash. ( Drawing 7 ) shows the sectional view of ( drawing 6 ). a waterworks faucet (not shown) -- a waterworks -- when flowing in the direction of an arrow head and flowing toward the upper layer from the lower layer of ion exchange resin 16, as the water led with the conduit 27 understands ion exchange resin 16, it flushes it, and it carries out a back wash so that it can reproduce efficiently with brine. namely, a waterworks -- a conduit 27 -- a valve body 18 -- entering -- the passage 29-2 of the three way switch bulb 29 -- the catchment pipe 35 -- caudad -- going -- flowing -- a filter 36 -- the lower layer of ion exchange resin 16 -- entering -- the upper layer -- going -- flowing -- the filter presser-foot plate filter 19 of 20 yen -- passing -- the slot 29-1 of the three way switch bulb 29 -- discharge -- it is washed away from a conduit 28. ( Drawing 8 ) shows the sketch at the time of playback actuation. The cartridge-type salt recycled bottle section is attached, and the time of setting the horizontal handle 32 as a reproductive location is shown. ( Drawing 9 ) shows the sectional view of ( drawing 8 ). a waterworks faucet (not shown) -- a waterworks -- when the water led with the conduit 27 flows in the direction of an arrow head and it flows toward a lower layer from the upper layer of ion exchange resin 16, the hard water component of calcium++ and Mg++ of which ion exchange resin 16 was adsorbed explains the flow permuted and reproduced with Na ion of brine with the sign of drawing. a waterworks -- from a conduit 27, it enters from a valve body 18, and by flowing more nearly up than the passage 29-3 of the three way switch bulb 29, it enters in the salt container 39 from the tip hole 38-1 of the salt container cap 38, salt 40 is melted, ejector mechanism 31 is passed as brine, and it goes into the upper layer of ion exchange resin 16 from the cave hole 18-4 of passage 29-4 and a valve body 18.

[0009] Next, brine flows under the ion exchange resin 16, from a filter 36, goes into the catchment pipe 35 and flows up. the passage 29-5 of the three way switch bulb 29 -- discharge -- brine is discharged from a conduit 28. When brine flows caudad from the upper part of ion exchange resin 16, the hard water component of calcium++ and Mg++ of which ion exchange resin 16 was adsorbed is permuted and reproduced with Na ion of brine. By making right and left rotate ejector mechanism 31, and adjusting spacing with the tip hole 38-1, salt concentration is made deep, or it is made thin, and is adjusted to the optimal salt concentration. Next, in order to make an understanding still easier, it illustrates partially and explains. ( Drawing 10 ) shows the fragmentary sectional view of a cartridge-type salt recycled bottle. 39 is a salt container, is put into salt 40 inside and bound tight with the salt container cap 38 through O ring 37. The tip hole 38-1 is formed at the tip of the salt container cap 38. ( Drawing 11 ) shows the top view of ( drawing 10 ). ( Drawing 12 ) shows the sectional view of a valve body 18. As for input and 18-3, 18-2 is [ a tap hole and 18-4 ] outflow cave holes. As for screw \*\* rare \*\* ( drawing 13 ), 18-5 shows the top view of ( drawing 12 ) to the water-softener container 15 in the screw section. The outflow cave hole of 18-4 is prepared in the direction of 45 degrees. ( Drawing 14 ) shows the side elevation of ( drawing 12 ). ( Drawing 15 ) shows the sectional view at the time of the

soft water extraction of the three way switch bulb 29. For ejector mechanism and 30, as for a slot and 29-2, an O ring and 29-1 are [ 31 / passage and 29-6 ] the installation screw sections of the catchment pipe 35. Tap water enters from a slot 29-1, and flows out from passage 29-2. Since this three way switch bulb 29 is rotated 180 degrees, at the time of a back wash, it enters from passage 29-2, and it flows out from a slot 29-1. ( Drawing 16 ) shows the sectional view at the time of playback of the three way switch bulb 29. Tap water enters from a slot 29-3, and flows out from passage 29-5. ( Drawing 17 ) shows the top view of ( drawing 15 ). ( Drawing 18 ) shows the C-D side elevation of ( drawing 15 ). ( Drawing 19 ) shows the A-B side elevation of ( drawing 16 ).

[Effect of the Invention] There is the following effectiveness in the small-with salt regenerator ion-exchange water softener of this invention.

(1) Small, cheapness, and operability are good at the small water softener which unified the function reproduced with brine.

(2) A salt container is a cartridge-type and can be set beforehand.

(3) Since the salt container is constituted by transparence, the residue of salt can be recognized visually. It means that playback was completed, when salt is lost completely.

As shown in (4) ( drawing 15 ) ( drawing 16 ), as structure of the three way switch bulb 29, as for a back wash, a C-D cross section serves as passage at the time of the soft water extraction, since it is constituted by division up and down so that a C-D cross section may serve as passage at the time of playback, salt is not mixed or a leak does not take place to a salt playback container side at the time of a back wash at the time of the soft water extraction.

(5) Since the conic three way switch bulb 29 is committed so that it may float up when tap water flows toward the upper part, since the three way switch bulb 29 and the catchment pipe 35 are linked directly, a rotation switch of the three way switch bulb 29 can be performed smoothly.

As shown in (6) and ( drawing 4 ), at the time of the soft water extraction, also at the time of a back wash, a cartridge-type salt regenerator can be set, and it can switch to playback by the horizontal handle 32 as it is, and is convenient.

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[Translation done.]